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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/871,004	05/31/2001	Joel W. Hoehn	S01.12-0805	7513

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11/06/2002

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EXAMINER

PADGETT, MARIANNE L

ART UNIT

PAPER NUMBER

1762

DATE MAILED: 11/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/871,004

Applicant(s)

Hoehn et al

Examiner

M.L. Padgett

Group Art Unit

1762

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- ☐ Responsive to communication(s) filed on 8/13/01
9/24/01, 2/12/02, 8/20/02
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 1-20 is/are pending in the application.
- ☐ Of the above claim(s) is/are withdrawn from consideration.
- ☐ Claim(s) is/are allowed.
- ☒ Claim(s) 1-20 is/are rejected.
- ☐ Claim(s) is/are objected to.
- ☐ Claim(s) are subject to restriction or election requirement

Application Papers

- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☐ All ☐ Some* ☐ None of the:
 - ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

*Certified copies not received: _____

Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 5, 6, 7
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other _____

Office Action Summary

1. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is vague and indefinite as its preamble is not commensurate in scope with its process steps. The former requires "forming a coating ...", while the only steps in the body of the claim remove material (fullerene layers), so that no coatings is ever formed, for the claim as written.

In claim 1, line 6 "the temperature", and in dependent claims 2-3 and 19 "a temperature" are objected to for having confused antecedence, i.e. the article usage appears to be backwards, as the first occurrence in claim 1 lacks proper antecedent basis, and then the later usages use the wrong article for a previously introduced term.

Other antecedent problems include "the fullerene" (claim 1, line 6, inconsistent term); "fullerene" and "a multilayer fullerene coating" (claims 2-4); "the laser beam generator" (claim 8, appears to be dependent from the wrong claim); "the entire exposed multilayer coating" (claim 12, last 2 lines, also logic problem here as the antecedence implies exposure already happened, therefore exposure to what?) and "fullerene" (claim 18, line 1).

In claims 12 and 13, "small" or "relatively small" are relative terms lacking clear metes and bounds, as the claims do not provide definition. A clear definition in the specification (original) or in cited relevant prior art could also provide such a definition, but was not found.

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2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 14 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamza et al.

Hamza et al (Abstract) teach a multilayer C₆₀ and/or C₇₀ fullerene coating on an Al surface, where after a multilayer desorption at 570 K and 620 K (297°C and 347°C), a mono-layer coverage remains there to 700 K, thus showing the substrate-fullerene bond energy must have that much energy to desorbs, as required by claim 16. In the results and discussion section (3), esp. on page 370 and Fig. 1, it is clear that temperatures below 570 K (or maybe 500 K) were not tried or employed, but that desorption (i.e. sublimation or evaporation, etc.) occurs in differing amounts at different temperatures non-linearly. It would have been obvious to one of ordinary skill in the art that other temperatures below those used could be determined by routine experimentation or optimization to minimize needed temperature for energy conservation or to protect

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temperature sensitive substrates, in order to achieve the same mono-layer results, where lower temperatures would have been especially desirable depending on the temperature sensitivity of substrate configuration. Note that testing lower temperatures for analogous fullerene desorption ability is also just good scientific method, and completing the record of characteristic abilities of multilayer fullerene films. Also note that these claims employ no significant difference in other steps from Hamza et al's process, i.e. while other factors could be added to the process due to the comprising language, as claimed none are apparently needed to cause fullerene (C_{60}) desorption at claimed temperatures.

4. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamza et al as applied to claims 1-3, 14 and 16-17 above, and further in view of Bethune et al.

While Hamza et al only discusses Al substrates, Bethune et al (abstract; col. 5, lines 37-48) shows that fullerene films in the mono-layer range are known to be used in magnetic layers, such as CoCr; hence it would have been obvious to employ Hamza et al's generic procedure to limit the thickness of fullerene layers on metal surfaces as taught by Bethune et al, because Hamza et al has been shown to provide an effective alternative means of removing only excess (more than the monolayer on the substrate) fullerene which provides desirable controllability, where routine experimentation to determine what temperatures were effective for specific substrates would have been expected.

5. Claims 1-3, 14-15 and 17-19 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over the IBM Bulletin "Molecular Brush Assembly" (1/1994).

The Bulletin (1/1994) discloses deposition of C_{60} on Au substrates (Fig. 1-2) with the intent of forming self assembly mono-layers, where to produce the mono-layer shown in Fig. 6, a solution that only specifically allows (encourages) bonds to the substrate, not to other molecules, is used and the microscope tip is used to push away molecules that are not part of the mono-layers on the substrate (Fig. 4-5). The substrates are then washed. The disclosure mentions no temperature input, thus room temperature may be assumed as understood.

Alternately, it would have been obvious to one of ordinary skill in the art to optimize the temperature to achieve the taught results, and as no heating is specified it would have been expected to be at or near room temperature.

6. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over IBM Bulletin (1/1994) as applied to claims 1-3, 14-15 and 17-19 above, and further in view of Bunshah et al (636).

The IBM Bulletin does not specify any particular solvent for the fullerene, hence one of ordinary skill in the art would look to the prior art to determine appropriate solvents to fulfill the teachings of the primary reference. In col. 5, lines 23-35, Bunshah et al discloses solvent as claimed for use in solubilizing fullerenes, where the temperature, i.e. "hot toluene", is noted to effect solubility. Therefore, it would have been obvious to one of ordinary skill in the art to use solvents taught in Bunshah et al

(636) to do the IBM (1/1994) process, with optimization of temperature for the particular solvent, in order to achieve the taught results.

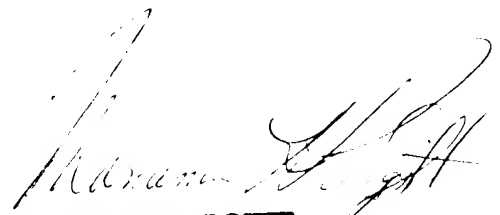
7. The published application, to a related inventive entity (Dykes et al) is cited for related material, but its claims are sufficiently differentiated.

8. Claims 4-13 are would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

9. Any inquiry concerning this communication from the examiner should be directed to M. L. Padgett whose telephone number is (703) 308-2336. The examiner can generally be reached on Monday-Friday from about 8 a.m. to 4:30 p.m.; and fax phone numbers are (703) 872-9310 (regular); (703) 872-9311 (after final); and (703) 305-6078 (unofficial).

M.L. Padgett/dh
October 31, 2002

Nov. 6, 2002



MARIANNE PADGETT
PRIMARY EXAMINER